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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applicants	:	Vasudevan Parthasarathy et al.
Application No.:		09/391,059
Filed	:	September 7, 1999
For	:	CODE MAPPING IN A TRELLIS DECODER
Examiner	:	Edith M. Chang
Art Unit	:	2634

APPEAL BRIEF

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May It Please The Honorable Board:

Appellants appeal from the FINAL Office Action dated July 21, 2004, in which claims 1-16 and 18-19 of the above-identified application stand rejected.

Appellants waive an Oral Hearing for this appeal.

Please charge the $340.00 fee for filing this Brief to Deposit Account No. 07-0832.

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Signature Patricia M. Tidwell Date: November 22, 2004

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I. REAL PARTY IN INTEREST

The real party in interest of Application No. 09/391,059 is:

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II. RELATED APPEALS AND INTERFERENCES

There are no related Appeals or Interferences.

III. STATUS OF THE CLAIMS

Claims 1-16 and 18-19 are pending in this application. Claim 17 has been canceled.

Claim 1-16 and 18-19 have been rejected.

The rejection of claims 1-16 and 18-19 are appealed.

IV. STATUS OF AMENDMENTS

In response to the FINAL Office Action dated July 21, 2004, appellants' representative filed a Notice of Appeal on October 18, 2004.

This appeal is directed to the claims as they stood at the time of the FINAL Office Action of July 21, 2004 and as shown in the Claims Appendix of this Brief.

V. SUMMARY OF CLAIMED SUBJECT MATTER

There are four independent claims in the application: 1, 5, 13 and 18.

All of Appellants' independent claims are directed to a method or apparatus for demapping received encoded symbol data to provide decoded symbol data.

In this regard, claim 1 is directed to a method that requires at least four types of data. The first type of data is "**delayed data**," which represents received encoded symbols that are delayed in time. (Claim 1, ln. 3; Appellants' specification, p. 6, ln. 20). The second type of data are **re-encoded symbols**. The latter are derived by decoding received encoded symbols to produce decoded symbols, which are then re-encoded. (Claim 1, ln. 4; Appellants' specification, p. 6, lns. 17-19.) The third type of data is "**difference data**," which is produced by the feed-forward processing of re-encoded symbols. (Claim 1, lns. 4-8; Appellants' specification, p. 4, lns. 5-7; p. 21, lns. 10-17; p. 21, ln. 40 to p. 22, ln. 3, FIG. 11.) The "difference data" represents a "difference between successive symbols of said re-encoded symbol data." (Claim 1, lns. 7-8; Appellants' specification, p. 21, lns. 17-19; signals between elements 960 and 965 of FIG. 11.) Finally, **decoded symbols** are derived by using the "delayed data and the "difference data." (Claim 1, lns. 9-10; Appellants' specification, p. 21, lns. 19-28, FIG. 11.)

Appellants remaining independent claims 5, 13 and 18 are directed to various apparatus having similar requirements to those found in method claim 1.

In particular, independent apparatus claim 5 is an apparatus form of method claim 1. Claim 5 requires a delay element (70 of FIG. 1) for producing "delayed data," a re-encoder (50 of FIG. 1) for producing re-encoded symbol data; and a processor (60 of FIG. 1) for performing the above-described feed-forward processing on "difference data" and for deriving the decoded symbol data using the "difference data" and the "delayed data."

In like fashion, independent apparatus claim 13 requires a delay element (70 of FIG. 1) for producing "delayed data," a re-encoder (50 of FIG. 1) for producing re-encoded symbol data; and a processor (60 of FIG. 1) that includes a feed-forward processor (element 960 of Fig. 11) and a decision processor (elements 965, 971, 973, 963, 977, 964, 975 and 980 of FIG. 11). The feed-forward processor performs the above-described "feed-forward processing;" and the decision processor derives the decoded symbol data using the "delayed data" and the "difference data."

Finally, independent apparatus claim 18 specifies a trellis decoding apparatus similar in form to the above-described independent claim 13.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner has rejected claims 1-16 and 18-19 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,914,988 issued June 22, 1999 to Hu et al. ("*Hu*").

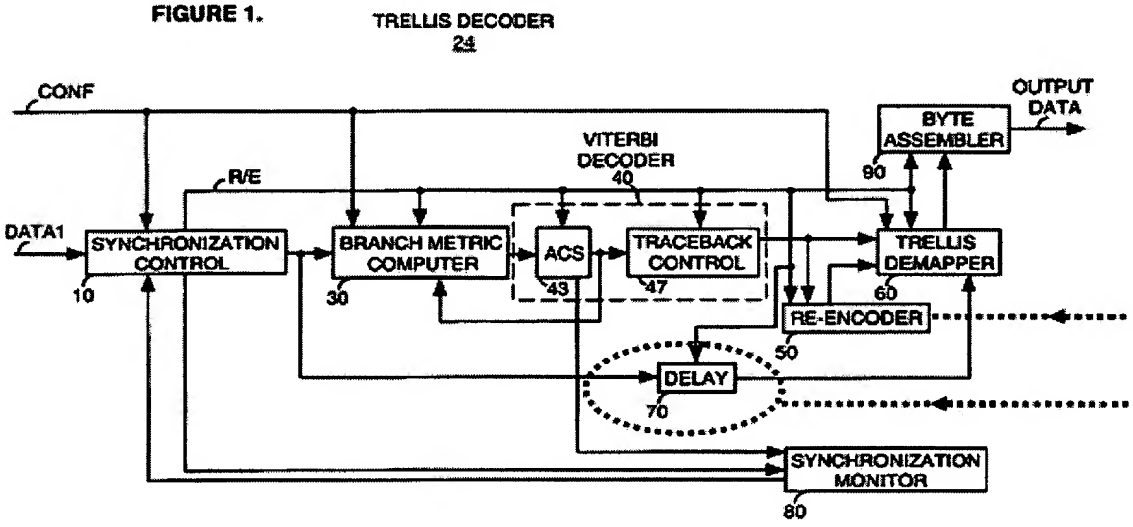
VII. ARGUMENT

Rejection of Claims 1-16 and 18-19 under 35 U.S.C. § 102(e) as being anticipated by *Hu*

BACKGROUND

Before addressing the Examiner's points, some background information is provided with respect to *Hu*. Although the technology described in *Hu* is somewhat complex, a couple of simple points can be observed from FIGs. 1 and 11 of *Hu*. In this regard, attention should first be directed to an annotated version of FIG. 1 of *Hu*, which is shown below.

FIGURE 1.



This figure of *Hu* provides an overview of the signal processing. Attention should be first directed to those portions of FIG. 1 indicated by the dotted-line circles and arrows toward the right of this figure that point out delay unit 70 and re-encoder 50. It should be observed from FIG. 1 of *Hu* that delay unit 70 processes a signal from synchronization control unit 10. In particular, delay unit 70 delays received encoded symbol data to provide "delayed data" to trellis demapper 60. (*Hu*, col. 3, lns. 31-33, 41-45; col. 4, lns. 27-30.)

Re-encoder 50 of Hu **re-encodes decoded data** provided by element 40 of FIG. 1. As stated in *Hu*:

> [u]nit 50 re-encodes the sequence of bits from unit 47 to provide a re-encoded bit sequence to demapper 60.
>
> *Hu*, col. 4, lns. 26-27; emphasis added.

This re-encoded bit sequence from re-encoder 50 is referred to herein as the "re-encoded symbol data." It should also be observed from FIG. 1 of *Hu* that re-encoder 50 does not process any signals from delay unit 70.[1] Thus, none of the delayed data is re-encoded by re-encoder 50 in *Hu*.

Attention should now be directed to an annotated version of FIG. 11 of *Hu*, which is shown below.

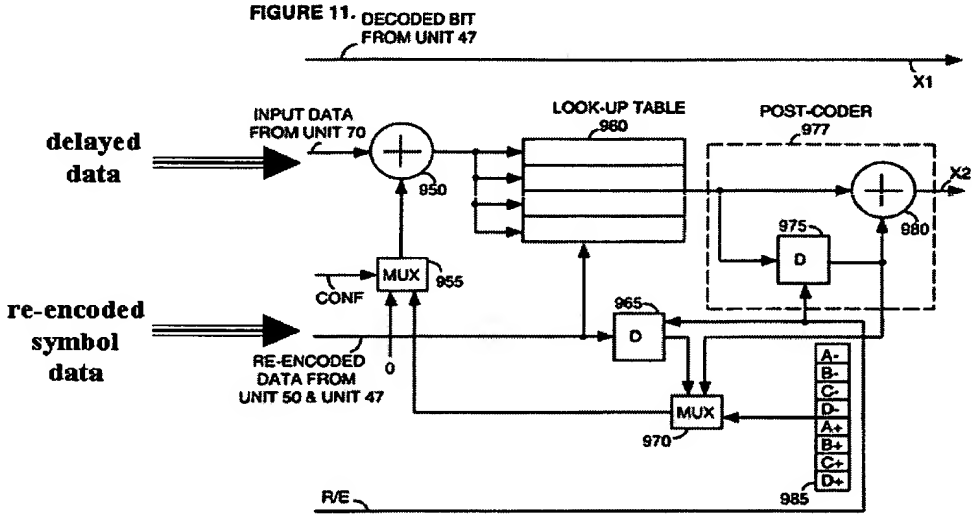


FIG. 11 of *Hu* shows in detail trellis demapper 60 shown in FIG. 1 of *Hu*. (*Hu*, col. 2, lns. 58-60.) The annotations added to FIG. 11 of *Hu* are the boldened terms "delayed data" and re-encoded symbol data" as well as the multi-lined arrows on the left of the figure. First, it should be noted that adder 950 receives input data from unit 70. Since unit 70, as shown in FIG. 1, is delay unit 70, "delayed data" is provided to adder 950. In particular, *Hu* states:

> [i]n non-filtered data mode as selected by the CONF signal, input delayed symbol data of a first interleaved symbol from unit 70 is passed unaltered by adder 950 of the demapper unit of FIG. 11.
>
> *Hu*, col. 13, lns. 53-54; emphasis added.

Second, it should be noted that the re-encoded symbol data (from re-encoder 50 of FIG. 1) is not applied to adder 950 of FIG. 11.

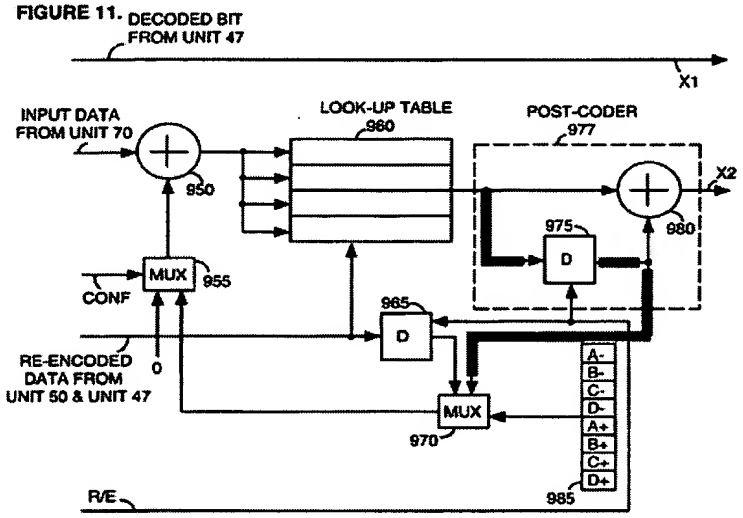
Finally, it should be noted that trellis demapper 60 of FIG. 11 has two modes of operation - a "non-filtered data mode" and a "filtered data mode." The particular mode of operation is controlled by the CONF signal applied to MUX 955 of FIG. 11. The CONF

[1] While col. 13, ln. 57, of *Hu* makes reference to re-encoded data "from units 50 and 70", this reference to unit 70 is clearly in error in light of FIG. 1 of *Hu*.

signal indicates whether or not the received signal is filtered by an NTSC co-channel interference rejection filter. (*Hu*, col. 3, lns. 53-57.)

In the "non-filtered data mode," delayed data simply passes through adder 950 unaltered because MUX 955 (as controlled by the CONF signal) simply provide a zero value. (*Hu*, col. 13, lns. 52-55.) However, in "filtered data mode," MUX 955 (as controlled by the CONF signal) causes the "delayed data" to be summed (via adder 950) with one of a number of **predetermined values** from unit 985, via MUX 970. (*Hu*, col. 14, lns. 11-15.)

In this "filtered data mode," a further point should be noted about *Hu*. This is highlighted in yet another annotation of FIG. 11 of *Hu*, shown below.



The annotations in this figure are the boldened lines. As noted above, in "filtered data mode," the CONF signal controls multiplexer (MUX) 955 to select the signal from MUX 970 for application to adder 950. MUX 970 provides one of eight constellation points from unit 985. (*Hu*, col. 14, lns. 10-15.) The particular constellation point selected is controlled by both a re-encoded symbol (via unit 965) and the output signal from look-up table 960 (via unit 975). The above-boldened lines highlight the fact that in "filtered data mode," trellis demapper 60 uses "feedback" due to the use of the output signal from look-up table 960 in selecting a particular one of the eight predetermined constellation points from element 985.

INDEPENDENT CLAIMS 1, 5, 13 and 18 ARE NOT ANTICIPATED BY *HU*

DEPENDENT CLAIMS 3, 7, 8, 9, 11, 12, 14, 16 and 19 ARE NOT ANTICIPATED BY *HU*

The Examiner 's rejection of independent claims 1, 5, 13 and 18 as anticipated by *Hu* is wrong for any one of a number of reasons. Appellants will discuss claim 1, below. Claims 5, 13 and 18 have similar requirements and stand or fall with claim 1. Similarly, dependent claims 3, 7, 8, 9, 11, 12, 14, 16 and 19 stand or fall with their respective independent claims.

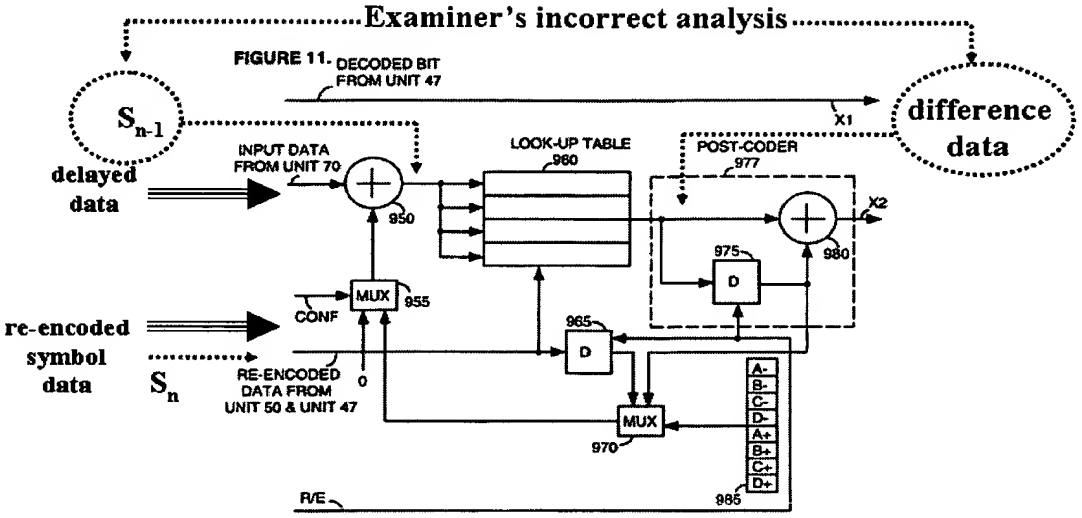
Appellants' claim 1 requires in part:

> (1) feed-forward processing said re-encoded symbol data to produce **difference data**; and
>
> (2) where the **difference data** is representative of a difference **between successive symbols of re-encoded symbol data**.
>
> Claim 1, lns. 6-8; emphasis added.

The Examiner states that these requirements are described and shown in *Hu*. In particular, the Examiner states that *Hu* describes:

> [a] processor (60 FIGURE 1, FIGURE 11) for feed-forward processing the re-encoded symbol data (output 50 FIGURE 1) to produce difference data representative (**output 960 FIGURE 11**) of a difference between successive symbols of the re-encoded symbol data (the successive symbols are S_{n-1} from 950, S_n from RE-ENCODED DATA of FIGURE 11; ***the difference is provided by the 960 as stated in column 13 lines 57-65, wherein the 960 does the comparing***.
>
> FINAL Office Action, p. 4; emphasis added.

As described below, the Examiner, respectfully, simply has it wrong. Below, is an annotated version of FIG. 11 of *Hu* with the Examiner's incorrect analysis highlighted.



First, the Examiner asserts that "the successive symbols are S_{n-1} from 950, [and] S_n from RE-ENCODED DATA of FIGURE 11." This is clearly wrong. Appellants' claim requires:

> "successive symbols of said re-encoded symbol data."
>
> Claim 1, lns. 7-8, emphasis added.

At the outset, reference to FIG. 1 of *Hu* clearly shows that re-encoded data is only provided by re-encoder 50 — not adder 950 as asserted by the Examiner. Indeed, reference to FIG. 11 of *Hu* shows that the output of adder 950 is not a re-encoded symbol since FIG. 11 clearly shows that re-encoded symbols are not applied to adder 950. Therefore, the Examiner's assertion that the output of adder 950 is a re-encoded symbol, S_{n-1}, is without support in *Hu*.

In fact, it should be noted that in the "non-filtered data mode," adder 950 of *Hu* does not alter the delayed data. (*Hu*, col. 13, lns. 52-56.) Thus, in this mode adder 950 clearly does not produce re-encoded data. And, in the "filtered data mode," the delayed data is merely added to one of a number of predetermined values. (*Hu*, col. 14, lns. 10-15.) Indeed, *Hu* states:

> [i]n the filtered data mode, modified and delayed symbol packet data for the first interleaved symbol from unit 70 (FIG. 1) is summed by adder 950 of FIG. 11 with one of the eight constellation point (symbol) values from unit 985 via muxes 955 and 970.
>
> *Hu*, col. 14, lns. 15, emphasis added.

This addition of one of a number of fixed values does not produce re-encoded data. Nor would one skilled in the art interpret this addition operation of adder 950 as re-encoding data.

In this regard, Appellants' note that in the Office Action of December 12, 2003, the Examiner made reference to the output of element 955 of FIG. 11 as a source of re-encoded data, i.e., that the

> output [of element] 955 which supplies another re-encoded data that one unit delayed from the first one (965-970-955 FIGURE 11 of Hu).
>
> Office Action dated 12/12/03, p. 2.

As noted above, this is incorrect. Again, reference to FIG. 1 of *Hu* clearly shows that re-encoded data is only provided by re-encoder 50 — not element 955 as asserted by the Examiner. Indeed, reference to FIG. 11 of *Hu* also clearly shows that re-encoded data is not supplied to the output of element 955. Again, in "non-filtered data mode," the output of element 955 is simply the value of zero; and in "filtered data mode," the output of element 955 is simply one of a number of predetermined of values, i.e., constellation points, provided by element 985. (*Hu*, col. 13, lns. 53-56; col. 14, lns. 10-15.) Appellants do not understand how a predetermined value is now re-encoded data as asserted by the Examiner.

Thus, the output from adder 950 is not re-encoded symbol data in any mode. In view of the above, the Examiner's position that the output of adder 950 represents a re-encoded symbol is without support in *Hu*.

Second, the Examiner asserts that look-up table 960 provides Appellants' claimed difference data. Again, the Examiner is wrong. Appellants' claim 1 requires:

> difference data representative of a difference between successive symbols of said re-encoded symbol data.
>
> Claim 1, lns. 7-8, emphasis added.

At the outset, since the above-described Examiner's assertion as to the identification of successive symbols of re-encoded symbol data in *Hu* is wrong, then the Examiner's assertion as to look-up table 960 providing difference data immediately fails.

In this regard, reference to FIG. 11 of *Hu* again shows that nowhere does *Hu* have an element that provides difference data representative of a difference between successive symbols of said re-encoded symbol data. As shown in FIG. 11, in "non-filtered data mode," look-up table 960 receives delayed data (via adder 950) and the current re-encoded symbol. As such, it is not possible for look-up table 960 to provide difference data between

successive symbols of said re-encoded symbol data. Indeed, even in "filtered data mode," the apparatus of FIG. 11 of *Hu* provides one of a predetermined number of values to adder 950 (from element 985) — again, these are not re-encoded symbols.

Appellants note that the Examiner also points to col. 13, lns. 57-65 of *Hu* for support. This portion of *Hu* states:

> [i]nput re-encoded data Z1 and Z0 from units 50 and 70 for the first interleaved symbol uniquely define one of the four cosets previously described, as indicated in symbol mapper table 125 of FIG. 2. For example, Z1=1, Z0=0, defines coset point C (-3, +5). Look-up table function 960 of FIG. 11 compares the input symbol output from adder 950 with each of the two constellation points in the coset defined by inputs Z1 and Z0. **The constellation point closest to the received delayed symbol point is determined and** the Z2 value of this constellation point **is provided** to post-coder 977 as the decoded Z2 value for the first interleaved symbol. Post-coder 977 uses adder 980 and register 975 to provide the inverse function of pre-coder 102 of FIG. 2, and to decode the Z2 value to give an X2 bit for the first interleaved symbol. Demapper 60 repeats this process for each interleaved symbol packet received from unit 70 using synchronized associated symbol data from units 47 and 50. In this manner a sequence of X2 bits for the interleaved symbols from unit 70 (FIG. 1) corresponding to the interleaved symbols input to decoder 24 are sequentially output from adder 980.
>
> *Hu*, col. 13, ln. 57 to col. 14, ln. 10, emphasis added.

However, nowhere does the above text from *Hu* describe Appellants' claimed

> difference data representative of a difference **between successive symbols** of said re-encoded symbol data.
>
> Claim 1, lns. 7-8, emphasis added.

Indeed, as indicated by the above-underlined text of *Hu*, look-up table 960 of *Hu* provides constellation points. (*Hu*, col. 13, lns. 64-67.) ***These represent symbols***. As such, look-up table 960 of *Hu* does not provide difference data as claimed by Appellants — thus, the Examiner's characterization that *Hu* provides difference data between successive symbols of said re-encoded data is wrong.

Finally, Appellants' claim 1 also requires:

> deriving decoded symbol data using said delayed data and said difference data.
>
> Claim 1, lns. 9-10.

For any one of the reasons described above, it is not possible for *Hu* to describe "deriving decoded symbol data using said delayed data and said difference data" as claimed by Appellants.

In view of the above, Appellants independent claims 1, 5, 13 and 18 are not anticipated by *Hu*. Consequently, all of Appellants dependent claims are also not anticipated by *Hu*.

DEPENDENT CLAIMS 2 and 6 ARE NOT ANTICIPATED BY *HU*

Although Applicants' claim 1 requires "feed-forward processing," Appellants' acknowledge the Examiner's statement in the FINAL Office Action that claim 1 does not particularly exclude "feed-back processing." However, Appellants dependent claims 2 and 6 do require that the feed-forward processing be "exclusive of feed-back processing."

In this regard, and as noted above, in "filtered data mode," the apparatus of *Hu* shown in FIG. 11 uses feed-back processing. In particular, the selection of a constellation point from element 985 is controlled by both a re-encoded symbol (via unit 965) and the output signal from look-up table 960 (via unit 975). As such, dependent claims 2 and 6 are not anticipated by *Hu* in the "filtered data mode."

With respect to the "non-filtered data mode," the apparatus of *Hu* is configured to not use feed-back processing. However, and as noted above, in this case, adder 950 of FIG. 11 of *Hu* provides delayed data in an unaltered form to look-up table 960. Thus, for the reasons described above with respect to Appellants' claim 1, claim 2 is also not anticipated by *Hu* in "non-filtered data mode."

In view of the above, claims 2 and 6 are not anticipated by *Hu* in any mode operation.

DEPENDENT CLAIMS 4, 10 and 15 ARE NOT ANTICIPATED BY *HU*

With respect to dependent claims 4 and 10, the Examiner states:

> Hu et al. discloses that the decision processor and its steps of comparing candidates values between the delayed data (input from unit 70 of 950 FIGURE 11) and the difference data (re-enocded [*sic*] data and input of 950 from 955 to LOO-UP [*sic*] TABLE 960 FIGURE 11) to determine minimum distance values (column 13, line 57 - column 14, line 28), and resolving equality between determined minimum distance values in response to a prior delay and fed back comparison representative output (975-970-950 FIGURE 11, column 14, lines 11-28).
>
> FINAL Office Action, p. 4; emphasis added.

Similar comments are made by the Examiner with respect to claim 15.

Again, the Examiner is simply wrong. Although Appellants do not agree with the Examiner's analysis of *Hu*, the Examiner's own analysis fails to show that *Hu* anticipates Appellants claims 4, 10 and 15.

Appellants' claims 4, 10 and 15 require "comparing candidate values representative of distance between said delayed data and said difference data." (Appellants' claim 4, lns., 3-4; claim 10, lns. 3-4; claim 15, lns. 3-4; emphasis added.) Thus, Appellants' claims 4, 10 and 15 require that a distance between said delayed data and said difference data be used to determine a candidate value.

Now, consider the "filtered data mode" of *Hu*. Here, the Examiner's argument contradicts itself in a number of ways. First, as indicated by the underlined portion of the Examiner's text above, the Examiner points to adder 950 as providing a re-encoded symbol. Yet, in FIG. 11 of *Hu*, **adder 950 is the only element that receives the delayed data**. In other words, if the Examiner takes the position that adder 950 somehow provides a re-encoded symbol, clearly the "delayed data" stops at the input to adder 950. Since no other element shown in FIG. 11 of *Hu* processes the delayed data except for adder 950, under the Examiner's own analysis **it is not possible** for the apparatus shown in FIG. 11 of *Hu* to determine a "distance between said delayed data and said difference data" as claimed by Appellants.

Second, in the "filtered data mode," the Examiner asserts that look-up table 960 receives re-encoded symbols and provides difference data. Again, under the Examiner's own analysis, it is not possible for look-up table 960 to determine a distance between said delayed data and said difference data as claimed by Appellants, since look-up table 960 **does**

not receive the delayed data. Indeed, it should be observed from FIG. 11 of *Hu*, that look-up table 960 only receives a single value representing a sum from adder 950. In other words, look-up table 960 does not know the value of the delayed data and does not know the value for the selected predetermined constellation point from element 985 that were applied to adder 950 of *Hu*.

In view of the above, in the "filtered data mode," *Hu* can not anticipate Appellants' claims 4, 10 and 15.

Now, consider the "non-filtered data mode" of *Hu*. In this case, adder 950 of FIG. 11 of *Hu* simply provides the delayed data in unaltered form to look-up table 960, as described above. (*Hu*, Col. 13, lns. 52-56.) In this case, the Examiner's analysis that adder 950 somehow provides a re-encoded symbol completely breaks down since adder 950 only provides the delayed data in unaltered form. Therefore, in this mode also, *Hu* does not anticipate Appellants' claims 4, 10 and 15.

Notwithstanding the above, and for the reasons described earlier with respect to Appellants independent claims, claims 4, 10 and 15 are also not anticipated by *Hu*.

As such, *Hu*, in any mode, and under any analysis, does not anticipate Appellants' claims 4, 10 and 15.

VII. CONCLUSION

For the above reasons, it is clear that *Hu* does not anticipate or make obvious appellants' claims 1-16 and 18-19. It is therefore respectfully requested that the rejection of claims 1-16 and 18-19 under 35 U.S.C. § 102(e) be reversed.

Respectfully submitted,

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November 22, 2004

IX. CLAIMS APPENDIX

1. (Previously presented) A method for use in a decoder, the method comprising the steps of:

delaying received encoded symbol data to produce delayed data;

re-encoding decoded symbol representative data to produce re-encoded symbol data;

feed-forward processing said re-encoded symbol data to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

deriving decoded symbol data using said delayed data and said difference data.

2. (Original) A method according to claim 1, wherein

said feed-forward processing is exclusive of feed-back processing.

3. (Original) A method according to claim 1, wherein

said feed-forward processing prevents error accumulation induced by error-propagation resulting from feed-back processing.

4. (Previously presented) A method according to claim 1, including the steps of

comparing candidate values representative of distance between said delayed data and said difference data, to determine minimum distance values, and

resolving equality between determined minimum distance values in response to a prior delayed and fed back comparison representative output.

5. (Previously presented) A decoder comprising:

a delay element for delaying received encoded symbol data to produce delayed data;

a re-encoder for re-encoding decoded symbol representative data to produce re-encoded symbol data; and

a processor for,

feed-forward processing said re-encoded symbol data to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

deriving decoded symbol data using said delayed data and said difference data.

6. (Original) A decoder according to claim 5, wherein

said feed-forward processing is exclusive of feed-back processing.

7. (Original) A decoder according to claim 5, wherein

said feed-forward processing prevents error accumulation induced by error-propagation resulting from feed-back processing.

8. (Previously presented) A decoder according to claim 5, wherein

said processor includes a decision processor for deriving said decoded symbol data by computing an absolute distance between said difference data and a corresponding delayed received encoded symbol of said delayed data.

9. (Original) A decoder according to claim 5, wherein said processor includes,

a decision processor for deriving said decoded symbol data by computing an absolute distance using said difference data and said delayed data, and

a comparator for comparing computed absolute distance values to determine a minimum symbol difference value.

10. (Previously presented) A decoder according to claim 5, wherein said processor includes,

a decision processor for comparing candidate values representative of distance between said delayed data and said difference data, to determine minimum distance values and resolving equality between determined minimum distance values in response to a prior delayed and fed back comparison representative output.

11. (Original) A decoder according to claim 10, wherein

said prior delayed fed back comparison representative output is only used in the case of equality between candidate minimum distance values.

12. (Original) A decoder according to claim 5, wherein

said processor derives decoded symbol data in a partial response system.

13. (Previously presented) A decoder comprising:

a delay element for delaying received encoded symbol data to produce delayed data;

a re-encoder for re-encoding decoded symbol representative data to produce re-encoded symbol data; and

a processor including,

a feed-forward processor for processing said re-encoded symbol data exclusively of feed-back processing in order to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

a decision processor for deriving said decoded symbol data by computing an absolute distance using said difference data and said delayed data.

14. (Original) A decoder according to claim 13, wherein said processor includes,

a comparator for comparing computed absolute distance values to determine a minimum symbol difference value.

15. (Previously presented) A decoder according to claim 13, wherein said processor includes,

a comparator for comparing candidate values representative of distance between, said delayed data and said difference data, to determine minimum distance values and resolving equality between determined minimum distance values in response to a prior delayed and fed back comparison representative output.

16. (Original) A decoder according to claim 15, wherein said processor uses a different configuration in resolving equality between candidate distance values than is used for deriving said difference data.

Claim 17 (Canceled).

18. (Previously presented) A trellis decoding apparatus comprising:

a delay element for delaying received trellis encoded data to produce delayed data;

a re-encoder for re-encoding decoded trellis encoded data using decision data associated with trellis state transitions in response to said trellis encoded data to produce re-encoded subset data;

a processor for,

feed-forward processing said re-encoded subset data to produce subset difference data representative of a difference between successive symbols using past subset outputs in an error propagation-free, feed-forward configuration; and

deriving decoded symbol data using said delayed data and said difference data.

19. (Original) A decoder according to claim 18, wherein

said error propagation-free feed-forward configuration of said processor derives decoded symbol data using past subset outputs instead of decoded bits themselves.

X. EVIDENCE APPENDIX (NONE)

None.

XI. RELATED PROCEEDINGS APPENDIX (NONE)

None.

PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 340

Complete If Known	
Application Number	09/391,059
Filing Date	September 7, 1999
First Named Inventor	Vasudevan Parthasarathy
Examiner Name	Edith M. Chang
Art Unit	2634
Attorney Docket No.	RCA 88,495 CUSTOMER NO.: 24498

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 07-0832

Deposit Account Name: THOMSON LICENSING INC., Customer No. 24498

The Director is authorized to: *(check all that apply)*

☒ Charge fee(s) indicated below ☒ Credit any overpayments
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	790	2001	385	Utility filing fee	
1002	350	2002	170	Design filing fee	
1003	550	2003	265	Plant filing fee	
1004	790	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		- ** =	0	X		=	0
Independent Claims		- ** =	0	X		=	0
Multiple Dependent				X		=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	43	Independent claims in excess of 3
1203	300	2203	145	Multiple dependent claim, if not paid
1204	88	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	210	Extension for reply within second month	
1253	980	2253	475	Extension for reply within third month	
1254	1,530	2254	740	Extension for reply within fourth month	
1255	2,080	2255	1,005	Extension for reply within fifth month	
1401	340	2401	165	Notice of Appeal	
1402	340	2402	165	Filing a brief in support of an appeal	340
1403	300	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,370	2453	665	Petition to revive – unintentional	
1501	1,370	2501	665	Utility issue fee (or reissue)	
1502	490	2502	240	Design issue fee	
1503	660	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Director	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
				Other fee (specify) ____	

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 340

SUBMITTED BY				Complete *(if applicable)*	
Name (Print/Type)	Joseph J. Opalach	*Registration No. (Attorney/Agent)*	36,229	*Telephone*	(609) 734-6839
Signature				*Date*	November 22, 2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.